



GOVERNMENT OF INDIA  
TARIFF COMMISSION

REPORT ON  
The Fair Price of Zinc Payable to the  
Metal Corporation of India Limited

BOMBAY 1959

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DR. RAMA VARMA

GOVERNMENT OF INDIA  
MINISTRY OF COMMERCE AND INDUSTRY  
**RESOLUTION**

*New Delhi, the 5th December, 1959.*  
*14th Agrahayana, 1881.*

**No. 15/15/Met./58.**—The Tariff Commission has submitted a Report on the fair price of zinc payable to the Metal Corporation of India Limited. Its recommendations are as follows :—

- (i) Urgent steps should be taken to implement Government's decision to instal a zinc smelter in the country and also to ensure that it commences regular production from 1962.
- (ii) The fair selling price *ex-Calcutta* of 1,812.09 tons of zinc which was allocated by Government to Tata Iron and Steel Co. Ltd., and Indian Iron and Steel Co. Ltd., should be Rs. 1,527.30 per ton or Rs. 1,503.17 per metric ton.
- (iii) The fair selling price *ex-Calcutta* of zinc allocated to the Steel Companies over and above 1,812.09 tons referred to above and to be allocated in future *i.e.* till 31st March, 1961 should be Rs. 1,538 per ton or Rs. 1,514 per metric ton so long as the gross realisation by Metal Corporation of India from the sale of its lead does not exceed Rs. 1,123 per ton or Rs. 1,105 per metric ton. If, however, realisation from lead during any quarter exceeds this figure, the selling price of zinc in the succeeding quarter should be adjusted in the manner indicated in paragraph 11.4.2. of the Report.
- (iv) Metal Corporation of India should give to Government at least a fortnight's notice of the probable date of arrival at Calcutta of its zinc, the quantity thereof, its gross realisation from the sale of lead in the preceding quarter duly certified by its auditor. On receipt of this notice Government should determine promptly the fair selling price and issue the necessary memo of allocation to the Steel Companies indicating the price payable. The Steel Companies should make full payment as soon as possible and in any case not later than three weeks from the delivery of the metal.

2. Government accept all the recommendations mentioned above. The Metal Corporation of India Ltd., Tata Iron and Steel Co. Ltd., and Indian Iron and Steel Co. Ltd., are also requested to take note of these recommendations for appropriate action. In this connection their attention is invited, *inter alia*, to the following :—

- (a) M/s. Tata Iron and Steel Co. Ltd., and Indian Iron and Steel Co. Ltd., will reimburse the Metal Corporation of India the difference between the fair price recommended by the Tariff

Commission namely Rs. 1,527.30 per ton and the provisional price of Rs. 1,270 per ton in respect of 1,812.09 tons of zinc allocated by Government up to the 10th August, 1958.

- (b) In regard to zinc allocations after the 10th August, 1958 and up to the 31st March, 1961, M/s. Tata Iron and Steel Co. Ltd., and M/s. Indian Iron and Steel Co. Ltd., will pay the Metal Corporation of India (i) the difference between the fair price recommended by the Tariff Commission namely Rs. 1,538 per ton (subject to the adjustment indicated by the Tariff Commission) and the provisional price of Rs. 1,270 per ton where such provisional price has already been paid and (ii) the fair price of Rs. 1,538 per ton (subject to the adjustment indicated by the Tariff Commission) in other cases.
- (c) The Metal Corporation of India should continue the practice of reporting all zinc arrivals to the Government of India.
- (d) The Metal Corporation of India should sell their zinc only to such parties as may be directed by the Government of India from time to time.
- (e) The Metal Corporation of India should note that there will be no upward adjustment of prices of zinc if the sales realisation from lead in any quarter averages less than Rs. 1,123 per ton.

#### ORDER

ORDERED that a copy of Resolution be communicated to all concerned and that it be published in the *Gazette of India*.

सत्यमेव जयते

R. V. RAMAN,

*Joint Secretary to the Govt. of India.*

## CONTENTS

PARAGRAPH	PAGE
1. Terms of reference . . . . .	1
2. Scope of inquiry . . . . .	1
3. Method of inquiry . . . . .	1
4. History and present position of the industry . . . . .	2
5. Metal Corporation of India Ltd. and its financial position . . . . .	6
6. Capacity . . . . .	10
7. Production . . . . .	10
8. Demand . . . . .	10
9. Our approach to the problem of fixing prices . . . . .	10
10. Actual cost of production . . . . .	15
11. Works costs . . . . .	21
12. Other recommendations . . . . .	27
13. Summary of conclusions and recommendations . . . . .	27
14. Acknowledgments . . . . .	28
 <b>APPENDIX</b>	
I. Government of India, Ministry of Commerce and Industry, letter No. 2 (7) Met. 57 dated 19th July, 1958.	29
II. List of persons who attended the Commission's discussions on 23rd December 1958.	30
III. Analysis of Balance Sheets of Metal Corporation of India Ltd., for the years ended 31st March, 1955, 31st March, 1956, 31st March, 1957 and 31st March, 1958.	31

सत्यमेव जयते

## REPORT ON THE FAIR PRICE OF ZINC PAYABLE TO THE METAL CORPORATION OF INDIA LIMITED

1. Metal Corporation of India Ltd., Calcutta, represented to Government its difficulties in disposing of its production of zinc owing to a steep fall in prices of the imported product. After **Terms of reference.** considering the representation carefully, Government decided that in view of the national importance of this industry, the zinc produced by it should be allocated in the ratio of 6:4 to Tata Iron & Steel Co. Ltd., and Indian Iron & Steel Co., Ltd., who are amongst the biggest users of zinc in the country. Accordingly, a total quantity of 1,440 tons of zinc was allocated to the two steel companies during the period from 31st May to 7th July, 1958. A Costing Team was also appointed by Government to fix a provisional price of zinc pending determination of a fair price by the Tariff Commission. It was Government's intention that the provisional price determined by the Costing Team should be paid by the two steel companies to Metal Corporation of India Ltd., for the time being and that any adjustments that might be necessary after the final price had been determined by us, on the basis of an inquiry undertaken in terms of Section 12(d) of the Tariff Commission Act, 1951 would be made later. A copy of Government's letter to us is given in Appendix I.

2. In interpreting the terms of reference and determining its scope, we have kept in mind the fact that this inquiry is confined to the determination of fair selling prices of 1,440 tons of zinc referred to in the foregoing paragraph and also for such supplies as may be allocated by Government to the two steel companies in future. Although much of the field covered by this inquiry is germane to an inquiry into the question of protection or assistance to the indigenous zinc industry, we do not propose to discuss in this report the case for tariff protection or assistance. This will be dealt with in a separate report.

3.1. On 18th September, 1958, a questionnaire was sent to Metal Corporation of India Ltd., Calcutta, asking for information on points relevant to this inquiry. Simultaneously the Development Wing was requested to furnish a detailed memorandum on this industry. A memorandum on the ore reserves at Zawar mines as well as any other lead and zinc ore deposits that may have been located in other parts of the country was invited from the Geological Survey of India. The Indian Bureau of Mines was requested to send a detailed memorandum indicating the possibilities of commercial exploitation of new ore deposits of lead and zinc, if any, that may have been located by the Geological Survey of India. An inquiry was made from the Ministry of Railways (Railway Board) of the present position of the proposal to connect Udaipur with Himmatnagar by rail via Zawar mines. The Ministry of Irrigation and Power was requested to inform us as to when power

from the Chambal Project is likely to be available to the proposed zinc smelter in Rajasthan. The State Governments of Rajasthan and Bihar were asked for memoranda about the present position of the industry in their respective States. The High Commission of India in London, the Indian Trade Commission in Sydney and the Embassy of India in Tokyo were requested to supply information about the position of the zinc industry in the United Kingdom, Australia and Japan respectively and the prices paid by smelters in those countries for zinc concentrates, etc. The Collectors of Customs at principal ports were asked for information about c.i.f. prices, clearing charges, etc. of recent imports of zinc metal. Tata Iron & Steel Company Ltd., and Indian Iron and Steel Co. Ltd., were also invited to offer their views on the question of price fixation of indigenous zinc.

3.2. Shri J. N. Dutta, Member, visited Zawar mines on 8th November, 1958. Dr. S. K. Muranjan, Shri J. N. Dutta and Shri R. S. Bhatt, Members, visited the Lead Smelter at Tundoo on 21st November, 1958. Dr. S. K. Muranjan and Shri R. S. Bhatt, Members, visited the Zawar mines on 29th and 30th November, 1958. Shri S. K. Basu, Senior Cost Accounts Officer visited the Zawar mines, the Lead Smelter at Tundoo and the Head Office of Metal Corporation of India Ltd., at Calcutta from 25th October to 13th November, 1958, and collected the necessary data for cost investigation.

3.3. We met the representatives of Metal Corporation of India Ltd., the Development Wing and the Geological Survey of India in our office at Bombay on 23rd December, 1958 and discussed with them, *inter alia*, the problems relating to their cost of production, future programme of operation and plans for further development. A list of persons who took part in the discussion is given in Appendix II.

4.1. Lead or Zinc metal is generally produced from either ore **History and present position of the industry.]** or scrap. Metal from ores is known as primary metal and that from scrap, secondary metal.

4.2. The production of primary lead or zinc metal involves the mining of crude ore, milling the ore to produce concentrates and smelting and refining to produce refined metal. In the production of secondary metal, the mining and milling functions are replaced by scrap collection, sorting and segregation.

4.3. Extraction of lead or zinc metal from ores is one of the oldest industries in the world. From the relics of old workings available at Zawar in Udaipur District, Rajasthan, it would appear that the art of manufacturing primary lead or zinc was not unknown to our people. Prospecting operations on the deposits at Zawar were restarted by the Mewar Durbar in 1872 but they were stopped shortly thereafter "due to difficulties in coping with water in the mines". Although this deposit of lead and zinc ore has been known since then, not much attention was paid to it prior to World War II. Mewar Mineral Co., who received a prospecting licence from the Mewar Durbar, did considerable work in opening up the deposits about the beginning of 1940. In 1942

after the loss of the lead-zinc ores of Bawdwin in Burma, the Government of India decided to work the Zawar mines under the direction of the Geological Survey of India. In consequence the licence granted to Mewar Mineral Co., was terminated and a licence was issued to the Government of India. Adits with cross-cuts were driven into selected sites in the Mochia Mogra hill well below the ancient workings. But as it was found that no supplies of lead or zinc could be made available from this source during the War, Government surrendered its mining rights to the Mewar Durbar in 1945. Thereafter a prospecting licence was issued by the Durbar to Metal Corporation of India Ltd., Calcutta in October, 1945. Subsequently the prospecting licence was replaced by a lease of the Zawar mine for a period of twenty years with effect from 1st April, 1950 with option of renewal for another twenty years. The mines are situated about 30 miles to the South of Udaipur City and are covered by a cluster of hills, namely, Mochia Mogra, Sonaria, Ruparia, Balaria, Zawar Mala and Baroi. Besides, there are a number of mineralised hillocks to the south of Zawar Mala but no prospecting work has yet been done in those areas.

4.4.1. The adits driven by the Geological Survey of India into the Mochia Mogra hill were at depths varying from 100 ft. to 450 ft. below the outcrops on the hill. Ores were found in all the adits but workable values were obtained in only one of them (No. 3 adit). The total underground exploration work done at that time (from 1942 to 1945) is reported to have been as follows :—

Adits . . . . .	4,476 ft.
Drives . . . . .	3,601 ft.
Cross-cuts . . . . .	2,240 ft.
Winzes . . . . .	105 ft.
TOTAL . . . . .	<u>10,422 ft.</u>

The total ore reserves were estimated at 91,000 tons containing 13.3 per cent. of combined lead and zinc metals.

4.4.2. The underground exploration work done by the Corporation on this hill is :—

Adit No. 6. . . . .	1,000 ft.
Adit No. 7. . . . .	763 ft.
Adit No. 8. . . . .	880 ft.
TOTAL . . . . .	<u>2,643 ft.</u>



Adit No. 6 has been equipped with all haulage equipments, such as track and pipe lines, locomotives, buckets, skips, etc. and serves as the haulage adit. Work is now carried on at 4 levels which are connected by winzes and raises. Level No. 1 corresponds to adit No. 3 and level No. 2 to adit No. 6 (haulage adit). The footage covered by the main drives at these levels on 1st December, 1958 was :

1st level	.	.	.	.	.	.	.	.	.	.	4,106 ft.
2nd level	.	.	.	.	.	.	.	.	.	.	4,046 ft.
3rd level	.	.	.	.	.	.	.	.	.	.	2,611 ft.
4th level	.	.	.	.	.	.	.	.	.	.	1,623 ft.
TOTAL											12,386 ft.

The proved ore deposits at these four levels were estimated on 1st July, 1958 to be 3·693 million tons on the basis of 3 per cent. cut off and the combined metal content of the ore reserve at 7·4 per cent. Since July 1958 the mine has been developed to yield 500 tons of run-of-mine ore per day.

4.5.1. In addition to actual mining, the Corporation has claimed that it has been carrying on "footage development" of about 10,000 ft. a year. In 1951 it entered into an agreement with Kamioka Mining and Smelting Co. Ltd., Japan (now Mitsui Mining and Smelting Co. Ltd.) under which the latter has been lending since 1952 the services of one of its experienced mining engineers for a period of two years at a time to assist the Corporation in its mining operations and also in developing the mine. Mitsui Mining has also trained one of the Corporation's Indian Mining Engineers in Japan.

4.5.2. The following prospecting and development work in the leased area is at present in progress.

4.5.2.1. *Mochia Mogra*.—In adit No. 6 the drive along the main lode is being extended westward. Development is also proceeding on the 3rd and 4th levels for further stoping. Drilling has been done at regular intervals in the 4th level and also to a certain depth below the 4th level.

4.5.2.2. *Zawar mala and Bara mala*.—At the instance of Metal Corporation of India, detailed geological mapping of these hills has been done by Mitsui Mining and Smelting Co. Ltd. At Zawar mala the Corporation has done some exploratory work by driving a cross-cut adit. It has also made arrangements for adequate supply of water for drilling operations and has acquired five mobile compressors for the purpose. Further prospecting will be undertaken when funds are available.

4.6. The Corporation had earlier erected a small pilot lead smelter at Tundoo near Dhanbad (Bihar) where it was smelting small quantities of lead ores from its Banjari mine at Jaipur. After it had acquired the Zawar mines, it added two blast furnaces and a few sintering pots.

A Dust Chamber to collect the dust in sinter fumes and a Bag house to recover the flue dust from the Blast furnaces were also installed. A silver refinery including a Dezincifying Plant, Retort Furnace and a Double Cupellation furnace was added in 1954. The present installed capacity of the lead smelter is 6000 tons of lead metal per annum. The Corporation maintains at Tundoo a small township with a small dispensary and hospital. Electricity is obtained from Sijua (Jharriah) Electric Supply Co. Ltd.

4.7. At the time when the Corporation took possession of the mine there was no ore-dressing plant. The ores were hand-dressed and despatched to Tundoo for smelting and producing pig lead. No zinc concentrates were produced. An ore-dressing plant operating on the differential flotation basis (which enables lead and zinc concentrates to be separated) was installed at the mine site in 1950. The Corporation is at present the only unit in India which is engaged in the production of primary lead metal. It also produces zinc concentrates which are sent to Japan for treatment on 'toll basis' and the recovered zinc metal is brought back to this country.

4.8. The ores mined at Mochia Mogra are composite sulphide ores of lead and zinc with impurities like silver, cadmium, etc. Slabs of mined ore (about 14" to 18" size) are brought in buckets and each bucket is weighed on a weigh-bridge before the ore is fed into a hopper. The slabs are crushed first by a Tel-smith Jaw Crusher and then by Traylor Crushers and finally to  $\frac{1}{4}$ " size by a Symons Cone Crusher in close circuit with a vibrating screen. The crushed ore is then wet ground to 65 mesh and below to form a slurry with 50% solid. The slurry, which contains mainly lead sulphide and zinc sulphide is treated in flotation cells with chemicals like zinc sulphate, sodium cyanide and potassium ethyl xanthate. Cresylic acid is then added as a frother and lead sulphide starts to float and is withdrawn with froth paddles to the thickener. After lead sulphide has been removed, the residual liquor is treated with copper sulphate and certain other chemicals. Cresylic acid is added and zinc sulphide begins to float and is removed with froth paddles. The concentrates are then filtered in vacuum filters and dried. Lead concentrates are bagged and sent to Tundoo while zinc concentrates are sent in bulk in trucks to Udaipur where they are filled in steel drums for despatch via Bombay/Kandla to Japan for treatment on 'toll basis'.

4.9. At the mine the Corporation maintains a well-equipped laboratory where lumps of ores and concentrates are tested. It has constructed a Power House with Diesel generating sets with an installed capacity of 3100 kws. an air compressor unit and a small repair shop. The Corporation has also built a small township at the mine site with its own water-supply, drainage and maintains a dispensary and a hospital with 3 beds. The average number of workers employed at the mines (including the ore-dressing plant) during 1957-58 was 1,004. In addition, there were 11 officers (including the Japanese Mining Engineer) and 72 members of supervisory and clerical staff.

5.1. Metal Corporation of India Ltd. was registered in Calcutta in 1944. It had on 31st March, 1958 an authorised capital of Rs. 5 crores and a paid up capital of Rs. 50 lakhs. It is managed by Managing Agents, Eastern Smelting and Refining Co. Private Ltd., whose remuneration is 10 per cent. of the profits of the corporation subject to a minimum of Rs. 36,000/- per year. The Corporation received in 1950 a mortgage loan of Rs. 30 lakhs secured on its fixed assets from the Industrial Finance Corporation of India. In addition, Government has furnished to the I.F.C. a guarantee for the repayment of the loan. For this guarantee the Corporation has entered into an agreement with Government providing, *inter alia*, that the latter would have the right to acquire the assets of the Corporation within two years after the expiry of five years from the date of receipt by the Corporation of the first instalment of loan from I.F.C. In terms of this agreement Government could have exercised the right to acquire the assets on or before 30th September, 1957 but they extended the period; the current period of extension is due to expire on 31st March, 1959.

**Metal Corporation of India Ltd. and its financial position.**

5.2. In Appendix III will be found an analysis of the balance sheets of Metal Corporation for the years ended 31st March 1955, 31st March 1956, 31st March 1957 and 31st March 1958. The paid-up capital as on 31st March 1958 was Rs. 50 lakhs comprising :

Ordinary shares . . . . .	Rs. 40 lakhs
5% tax-free cumulative preference shares . . . . .	Rs. 7 lakhs
Deferred shares . . . . .	Rs. 3 lakhs
<b>TOTAL . . . . .</b>	<b>Rs. 50 lakhs.</b>

There was an increase in the paid-up capital during 1955-56 by Rs. 14 lakhs which was effected by the issue of shares to Indian Steel and Wire Products Ltd. against cash. On 31st March 1955 the total borrowings of the Corporation were Rs. 48·43 lakhs out of which Rs. 27 lakhs represented the outstanding balances of loan from the Industrial Finance Corporation. On 31st March 1958 the borrowings had gone up to Rs. 61·52 lakhs though during the interval between 1955 and 1958 the outstanding against the I.F.C. loan had gone down to Rs. 18 lakhs. Since 1st April 1955 Metal Corporation has invested about Rs. 30 lakhs in fixed assets partly from the fresh share capital issued during 1955-56 and partly from internal resources. As on 31st March 1958 the gross block stood at Rs. 113·95 lakhs (including Rs. 11·98 lakhs which represented preliminary expenses of prospecting and proving ore reserves) and the written down value at Rs. 62·72 lakhs. The current assets were valued at Rs. 58·52 lakhs out of which 'dumped ores' containing non-millable grades accounted for Rs. 7·24 lakhs. The Corporation has not paid since 1952 any dividend on cumulative preference shares. It has been incurring losses year by year and the working result of 1957-58 disclosed a loss of Rs. 5·44 lakhs. The losses have depleted its working capital

and have obliged it to increase its borrowings which include the financial arrangements with Metal Distributors for part of its operations. Having regard to the nature of its operations and the amount of capital invested in its fixed assets, it would appear that Metal Corporation is under-capitalised. In the existing circumstances it is not in a position to raise fresh capital from the market. Further, it has not yet secured the full amount of the investment which some directors of the managing agency company promised to contribute towards enhancing its financial resources. In view of this the Corporation had not been able to instal some essential equipments at the mine as well as at the lead smelter. It is reported that the sinking of a shaft in the Central Zone of Mochia Mogra hill and the installation of a heavy media flotation plant at the mine site are urgent necessities. At Tundoo the operation can be improved considerably by the installation of a continuous Dwight-Lloyd sintering machine in place of the existing sintering pots.

5.3. As stated in paragraph 4.3. the Corporation obtained the prospecting licence of Zawar mines in 1945. At first the ores were hand-dressed and subsequently when an ore-dressing plant was installed with the loan obtained from I.F.C. the Corporation began to produce lead concentrates and zinc concentrates. Since the inception of operations at Zawar mines, the Corporation has been sending first its hand-dressed lead ore and then lead concentrates to its smelter at Tundoo. Zinc concentrates began to be produced from 1951 and at first they were exported to European countries: one half was sold outright while the other half was treated on 'toll' and the metal brought back to the country. Since 1953 the Corporation has entered into arrangements with Mitsui Mining and Smelting Co. Ltd. in Japan for smelting its entire zinc concentrates on 'toll basis'. The recovered metal is brought back to this country. So long as zinc prices in the international market ruled at high levels, Metal Corporation was in a position to dispose of its zinc metal. Since April 1957, however, international prices of zinc metal declined sharply which brought down the landed cost of the imported metal in the country. As a result the price that the Corporation was able to realise in the local market was far below the cost of recovered zinc and consequently it sustained heavy losses.

5.4. In 1955 the following phased programme was laid down by Government:—

*First stage.*—The mine should be developed so as to raise the output of run-of-mine ore to 500 tons a day.

*Second stage.*—Further development of the mine to be undertaken to raise the daily output to 1000 tons of run-of-mine ore.

*Third stage.*—After the mine has been developed to the extent indicated in the second stage, steps should be taken to establish a zinc smelter in the country.

The Corporation has completed the first stage and has prepared a development plan for the second stage and also obtained project reports for a zinc smelter from two foreign firms. Further progress has been held up for lack of funds.

5.5. The processing of zinc concentrates on "toll basis" and the selling of returned metal by the Corporation are governed by two agreements, namely, (a) agreement between the Corporation and Mitsui Smelting and Refining Co. Ltd., and (b) agreement between the Corporation and Metal Distributors Private Ltd. The salient features of these agreements are described below :—

*5.5.1. Agreement between Metal Corporation of India and Mitsui Mining and Smelting Co. Ltd., Japan:*

5.5.1.1. The current agreement which is dated 1st April 1958 provides for supply by the Corporation of about 9000 metric tons of zinc concentrates with margin of 10% packed in steel drums or bags and having standard analysis as follows with a guaranteed zinc content of 50 per cent minimum :—

Zinc . . . . .	54.7%
Lead . . . . .	3.9%
Insolubles . . . . .	1.09%
Iron . . . . .	4.2%
Calcium . . . . .	0.72%
Magnesium . . . . .	0.54%
Cadmium . . . . .	0.25%
Sulphur . . . . .	30.32%

After the steel drums have been emptied, they are sold as scrap in Japan and the sale proceeds are deducted from the processing charges.

5.5.1.2. The concentrates on arrival at the smelter in Japan are weighed and three samples are drawn from each lot of 100 metric tons by Mitsui Mining and Smelting Co. Ltd. One sample is analysed by the representative of the Corporation, the second by Mitsui Mining and Smelting Co. and the third is kept as reserve for use in cases of dispute. If the results of the two analyses do not vary by more than 0.5 per cent. of zinc in the concentrates on dry basis, the mathematical average of the two assays is accepted as the basis for calculating the quantity of returnable metal. If, however, the two analyses vary by more than 0.5 per cent of zinc content, and the two parties fail to reach an agreement on the matter, the third sample kept as reserve is sent to the Osaka Mint of the Japanese Government for assay. When this assay lies between the assays made by the two parties the mean of the Government assay and the assay of the party nearest to it is accepted as the final assay. If, however, Government assay is not intermediate between the assays of the two parties the assay of

the party nearest to the Government assay is accepted as the basis for return of the metal. The quantity of the refined metal returnable by the Japanese smelter is obtained by multiplying the dry tonnage of concentrates with the weighted mathematical average of zinc content of each lot of concentrates less 8 units. In other words, the formula is as follows:—

$$\text{Quantity of returnable metal} = \text{Dry tonnage of concentrates} \times (\text{Weighted mathematical average percentage of Zn. content of concentrates minus 8\%}).$$

The quality of zinc ingot to be returned is distilled zinc ingot of guaranteed purity of 98.5 per cent zinc minimum and this metal is required to be shipped within sixty days from the date of completion of weighing the concentrates for each shipment at the smelter.

5.5.1.3. The processing charges payable to the Japanese smelter depend on the quotations for zinc on the London Metal Exchange and are governed by the following formula:—

L. M. E. Quotation	Charges payable per dry metric ton of concentrates
Below £ 65	\$38
Between £ 65 and below £ 70	\$39
Between £ 70 and below £ 75	\$40
Between £ 75 and below £ 80	\$41
Between £ 80 and below £ 85	\$42

The Japanese smelter does not allow any credit for cadmium, silver and sulphur present in the concentrates. It was represented to us that the above charges were lower than the comparable processing charges quoted by smelters in other countries.

5.5.2. *Agreement between Metal Corporation of India Ltd. and Metal Distributors Private Limited.*—Under this agreement, the finances required for transport of zinc concentrates from the mine to Udaipur, unloading of concentrates at Udaipur, packing them in steel drums, handling and loading the filled drums in wagons, railway freight to Kandla, unloading at Kandla, port charges, shipping freight and insurance charges to Japan, analysis and treatment charges in Japan and all expenses on the returned metal are first advanced by Metal Distributors. The interest payable by the Corporation on such advances is 7 per cent. per annum. In addition, Metal Distributors receive a commission of 1 per cent on the net sale value of zinc metal sold. Any brokerage paid by them is also recoverable from the Corporation. Prices of metals are, however, determined by Metal Corporation from time to time.

6.1. The mining capacity has, with effect from July 1958, been raised to 500 tons of run-of-mine ore per day. The milling capacity **Capacity.** has also been raised to 500 tons of concentrates per day. The milling and concentration plant requires an adequate supply of water all the year round, roughly in the ratio of 4 tons of water to 1 ton of ore but water is a problem at the mines and due to shortage of water in the summer, the milling and concentration plant could not be worked to capacity during that period in the past. Water is at present drawn from the nearby Tiri river and although the Corporation has constructed a sub-soil water dam near the mine, it has not been able to solve the problem of water satisfactorily. It has plans to instal at an approximate cost of Rs. 5 lakhs a Heavy Media Flotation Plant (where requirements of water are less) but further action has been held up on account of financial difficulties.

6.2. The rated capacity of the lead smelter is 6000 tons of lead metal per annum.

7. Actual production since 1954-55 has been as follows :—

**Production.**

Year	Lead (Tons)	Zinc concentrates (Tons)	Zinc metal received back (Tons)
1954-55 . . . . .	1,884	4,437	2,072
1955-56 . . . . .	2,143	5,107	1,333
1956-57 . . . . .	2,663	7,660	3,220
1957-58 . . . . .	3,470	6,790	3,244
1958-59 . . . . .	2,364	5,699	1,810

(9 months from April—December).

8. The Development Wing as well as Metal Corporation of India have estimated the domestic demand for zinc metal at 55,000 tons for 1958 and 65,000 tons per annum at the end of the three years. **Demand.**

9.1. According to our terms of reference we are required to fix the prices payable by Tata Iron and Steel Co. Ltd., and Indian Iron Steel Co. Ltd., for 1,440 tons of zinc already allocated to them by Government as well as for further supplies to be allocated in future. These 1,440 tons of zinc were received in return for the zinc concentrates shipped to Japan by the Corporation during 1957-58. The bulk of such concentrates was produced during the same year but a portion came from the **Our approach to the problem of fixing prices.**

1956-57 output. We shall, therefore, have to determine the actual cost of production of concentrates during each of the years 1956-57 and 1957-58 and the cost of subsequent processing of the concentrates shipped during 1957-58. The total quantity of zinc ingots returnable by the Japanese smelter against shipments of concentrates during 1957-58 was 3,052.47 tons out of which 1,240.38 tons had been sold by the Corporation before Government decided to allocate supplies to the steel companies. There was, therefore, a balance of 1,812.09 tons out of which 1,440 tons has been allocated upto 7th July 1958, leaving 372.09 tons for further allocation. The fair selling price determined for 1,440 tons should, *ipso facto*, apply to this quantity of 372.09 tons. We should like to add that since Metal Corporation is also a producer of virgin lead over which there is no price control, formal or informal, we have decided that the fair selling price should be worked out not only for the recovered zinc but also for virgin lead and that any excess realisation from the sale of lead over its fair selling price should be adjusted towards reduction in the fair selling price of the recovered zinc payable to Metal Corporation by the steel companies.

9.2. As regards prices for the output of zinc metal from concentrates shipped during 1958-59 and subsequent years, there are two important points which require clarification. First under the agreement with Metal Corporation it is open to Government to acquire the assets of the Corporation at the end of March 1959. Whether Government acquire the mine or allow the Corporation to continue for a further period, there should not be any cessation of production at the mines; otherwise large sums of money will have to be spent on maintenance and pumping in order to prevent excessive damage to mine equipment and installation as well as to underground workings from flooding. In the circumstances our estimates of cost should not be confined to 1958-59 alone but should be projected over a longer period. It is, therefore, necessary to indicate what the duration of this period should be.

9.3. Secondly, we have to consider the question whether the present arrangement under which zinc concentrates are sent abroad for processing on 'toll basis' is the most economical in the present condition of the industry and should be allowed to continue. As stated in paragraph 5.2., initially the Corporation used to sell its concentrates in European countries and started sending them to Japan for processing on 'toll basis' only from 1954. The representative of the Corporation urged that having regard to the absence of any smelting facilities in the country, the favourable terms which it has obtained from the Japanese smelter and the present state of the international market for lead and zinc, no better alternative is possible. Nevertheless, we cannot overlook the fact that the freight and processing charges under the present arrangement have raised the price of the returned metal to a level much higher than that of the imported metal. We have made some investigations whether our concentrates can be exported on better terms. The countries which are likely to be interested are Japan, Australia, U. K., France, Belgium, Italy, the Netherlands, Norway, Sweden, Spain, U.S.S.R., Czechoslovakia and Yugoslavia. Out of these,



Japan and Australia have informed us that they are not interested in buying our concentrates. The Corporation informed us that prices of concentrates in European countries are determined by the following formula:—

$$V = P (T - R) - RC$$

Where V = the price of concentrates c.i.f. Antwerp.

P = the price of the metal at the London Metal Exchange.

T = the metal content in the concentrates.

R = the normally admissible loss of metal during smelting, and

RC = the processing charge.

At present R is 8 per cent and RC \$ 52 when the L.M.E. quotation for zinc metal is £72. If the quotation is higher, RC goes up by 25 cent for each rise of £1. Similarly, if the quotation goes below £72, RC reduced by 18·75 cents for each decrease of £1. Assuming the L.M.E. quotation of zinc metal to be £75 per ton and the zinc content in our concentrates 56%, the c.i.f. Antwerp price of the concentrates will come to  $£75 \times \frac{(56-8)}{100} - \$52 : 75 = £36 - £19$  or £17 per dry metric ton. Freight and insurance to Antwerp from Kandla being Rs. 125·13 per ton, the net realisation per ton from our concentrates would not, according to the Corporation, exceed Rs. 101·54 [£17 (Rs. 226·67) - Rs. 125·13] per ton. This is about Rs. 139·56 less than the bare estimated cost of production of a ton of concentrates at Zawar mines without making any allowance for packing, handling and transport charges from the mine to Kandla). The estimated fair selling price of metal under the present arrangement works to about Rs. 1538/- per ton out of which the processing and analysis charges in Japan involve foreign exchange expenditure of Rs. 422 per ton of metal. The current landed cost of imported zinc being about Rs. 1,100 per ton, the present arrangement involves an extra payment by the steel companies of Rs. 438 per ton for zinc produced by the Corporation. On the basis of an estimated production of 4,589 tons a year the present arrangement involves (1) an extra payment by steel companies of Rs. 20·10 lakhs to Metal Corporation of India and (2) foreign exchange expenditure of Rs. 19·37 lakhs. If on the other hand the Corporation had exported its concentrates (9,560 tons) on outright sale basis, it would have suffered a loss of Rs. 13·34 lakhs but there would have been a gain of 9·71 lakhs in our foreign exchange resources. At the same time, there would have been an outgo of Rs. 50·48 lakhs in foreign exchange on the import of 4,589 tons of zinc (which would have been obtained if the concentrates had been processed on toll basis as at present). Thus the net result of the alternative arrangement of selling concentrates abroad and importing an equivalent quantity of zinc metal is (a) loss of Rs. 13·34 lakhs to the Corporation and (b) net loss of foreign exchange of the order of Rs. 40·77 lakhs. We understand that European buyers give some credit on account of the presence of silver, cadmium, etc., in the concentrates. We have not been

able to collect any data on this point but granting that it will reduce the loss to the Corporation to some extent we cannot overlook the fact that the import of an equivalent quantity of zinc would involve us in foreign exchange expenditure of about Rs. 41 lakhs against Rs. 19.37 lakhs involved in the present arrangement of getting the concentrates processed in Japan. In the present critical foreign exchange position the existing arrangement has on the whole proved to be of advantage to the country notwithstanding the fact that the cost of the recovered zinc is higher than that of the imported metal. We have, therefore framed the estimates of future costs on the basis of the continuance of the existing arrangement. The position, however, needs to be kept under constant watch and if at any time it appears that the export of concentrates and simultaneous import of equivalent quantity of zinc metal would not cause any additional strain in our foreign exchange resources, the question of terminating the present arrangement should be seriously considered.

9.4.1. While on the subject, we should like to emphasise that export of zinc concentrates is not in the best interests of the country whether on outright sale basis or toll basis. Since in the former case the amount paid by smelters for concentrates delivered at their doors is based on the metal content multiplied by prevailing market prices, after deductions to cover losses in smelting and cost of smelting, the seller of concentrates bears the brunt of the impact of market price cuts. Even in a rising market the exporter of concentrates does not get the full benefit of higher prices. In the latter case (that is, when concentrates are sent out on toll basis) heavy transport and processing charges payable to foreign smelters raise the price of the returned metal to a high level. The remedy obviously lies in the establishment of a zinc smelter. A Committee was appointed by Government in 1951 under the chairmanship of Shri Jehangir Ghandy. In a report submitted in 1953, the Committee examined the various issues involved and recommended that only after the Zawar mines are studied carefully and the ore position is well understood, the question of establishing and locating a zinc smelter should be taken up.

9.4.2. Metal Corporation has furnished the following estimates of ore reserve as on 31st March, 1958 at Mochia Mogra down to the 4th level :—

*A. On the basis of cut off of 3% total metal content—*

	Tonnage	Pb %	Zn %
Proved ore	36,92,767	2.2	5.2
Probable ore	11,01,880	2.0	4.9
TOTAL	47,94,647	2.2	5.1

*B. On the basis of cut off of 2% total metal content—*

	Tonnage	Pb %	Zn %
Proved ore . . . . .	56,66,036	1.5	3.7
Probable ore . . . . .	26,75,451	1.6	3.5
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TOTAL . . . . .	83,41,487	1.5	3.6
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After examination of the assay plan, mine development plan and workings, the Rajasthan Government accepted as correct the Corporation's estimate of ore reserve on the basis of 3% cut off. The estimate has also been accepted by the Geological Survey of India, who at our instance, deputed two Geologists to Zawar mines to check the calculations on the spot. These Geologists have also expressed the view that

“considering the geological factors involved, the ore can be reasonably expected to continue to a depth of 350 to 400 ft. below the 4th level.....

The reserves taken as proved and indicated for Mochia Mogra alone, can support a production of 1,000 tons of run-of-mine ore averaging about 2.2% lead and 5.1 zinc for 12 to 15 years. On a 2% cut off, the reserves (down to 4th level) averaging 1.5% lead and 3.6 zinc would be able to maintain the same production for 20 to 25 years. As mining proceeds, development below the 4th level would establish further reserves and could thereby extend the life of the mine. The possibilities of ore reserves in the other hills, Balaria, Zawar Mala and Bada, Magra (Boroi) are not known but may be expected to augment the total reserves.....

The reserves in Mochia Mogra alone, however, can be considered as sufficient to sustain a production of 1,000 tons a day which is the pre-requisite for a zinc smelter”.

9.4.3. We understand that the Government of India have taken a decision to the effect that a zinc smelter should be established in the country. As stated in paragraph 9:3 the present arrangement of processing zinc concentrates on “toll basis”, apart from making the returned metal very expensive, involves an expenditure of about Rs. 422/- per ton of metal in foreign currencies on smelting and analysis charges. This means a drain of about Rs. 19.37 lakhs in foreign exchange every year on the basis of 4,589 tons of returned metal. In addition, the expenses on the export of concentrates and import of the returned metal account for another Rs. 474/- per ton. Further, we receive no credits for silver, cadmium, sulphur, lead, etc. present in the concentrates. It should not also be forgotten that lead and zinc are critical metals and

their extreme importance was demonstrated over and over again during the war and it is unnecessary to recapitulate facts which are common knowledge. The mining and processing of lead and zinc is included in Schedule A to Government's Industrial Policy Resolution of 30th April, 1956. We are convinced that the industry has no future unless a zinc smelter is established in this country and that since there is no dearth of ores for operating a smelter of economic size for a number of years we recommend that urgent steps should be taken to implement Government's decision to instal a Smelter and also to ensure that it commences regular production from 1962. For this purpose, it may even be necessary to stockpile the output of concentrates during 1961-62 which may mean locking up capital of the order of Rs. 20 lakhs for a year but this must be faced in national interests. After examining all aspects of the case we have decided that our estimates of cost of future production of zinc metal should not be projected for a period beyond 1960-61.

10.1. On the basis of the data collected from the Corporation's books we have worked out the actual cost of production of zinc metal. **Actual cost of processed from the concentrates shipped during production. 1957-1958.**

10.2. Our Senior Cost Accounts Officer has examined the data relating to costs for 1957-58 and has worked out the cost of lead metal produced during 1957-58 and that of zinc metal obtained from Japan as a return for the concentrates shipped during 1957-58. As some quantities of lead concentrates and zinc concentrates produced in 1956-57 were in stock on 1st April, 1957 and were utilised in 1957-58 for the production of lead and zinc metal respectively, he has also worked out the costs of ores and concentrates for the year 1956-57. We are forwarding his report as a confidential enclosure. Brief comments on the various items of costs of production are given below:—

### 10.3. *Cost of run-of-mine ore*

10.3.1. *Production.*—During the period from April 1956 to August 1958 the daily output of run-of-mine ore was progressively stepped up from 280 tons to about 500 tons. Actual production was—

	1956-57	1957-58
	Tons	Tons
Quantity taken out of mine . . . . .	95,997	100,176
Less Waste . . . . .	9,172	7,570
Net run-of-mine ore . . . . .	86,825	92,606

Further, as the "shrinkage stope" method of mining has been adopted, considerable portion of the ores broken is initially left in the opening (stopes) and withdrawn later. Since during 1956-57 and 1957-58 the mine was being developed by the opening of fresh stopes, the quantity

of broken ores left in the stopes at the end of a period was higher than the quantity which was inside the stopes at the beginning. The ores left inside the stopes needed further blasting, sorting, etc., before they could be taken out as run-of-mine ore. For calculating the cost of mining, we have added to the quantity of run-of-mine ore actually extracted, one-half of the excess of broken ores left inside the stopes at the end of a year over those left at the beginning of that year. The quantities arrived at were as follows :—

	1956-57	1957-58
	Tons	Tons
Run-of mine ore . . . . .	86,825	92,606
Half of the excess broken ores left inside the stopes . . . . .	11,421	7,070
TOTAL . . . . .	98,246	99,676

10.3.2. The Corporation had a dump of 66,832 tons at the beginning of 1957-58 made up of (i) a stock of 20,304 tons left behind by the Geological Survey of India in 1945 and (ii) subsequent additions of excesses of ores mined over the ores dressed from year to year. The representatives of the Corporation urged that most of the ores are unmillable as being of very low grade. We discussed the matter with the representatives of the Geological Survey of India and the Development Wing and have agreed that the stocks left behind by the Geological Survey and the stocks that were added when the ores used to be hand-dressed could be discarded as unmillable; but the stocks built subsequent to the establishment of the ore-dressing plant should be regarded as workable run-of-mine ore and should be taken into account for determining the average cost of run-of-mine ore during 1956-57 and 1957-58. The effect of this adjustment has been a reduction of 1957-58 cost from Rs. 21.48 to Rs. 20.21 per ton.

10.3.3. *Depreciation*.—Detailed data for calculating depreciation separately for the mines, the ore-dressing plant and the lead smelter were not available. Accordingly, it was calculated on the basis of the Corporation's Income-tax returns and suitable allocations were made for the mines, the ore-dressing plant and the smelter.

10.3.4. *Depletion allowance*.—Since mining operations must proceed simultaneously with the development of the mine, the Corporation has been debiting since 1956-57 all current expenditure on development to 'Revenue'. Previously, that is, when the mine was not producing sizable quantities of run-of-mine ore, it was capitalising all expenditure on exploration and development. The 'bulk' of such expenditure (about Rs. 13 lakhs) was in the nature of essential preliminary expenses for a mining industry. Since 1956-57, the Corporation has been writing off the latter type of expenses at the rate of Rs. 1.09 per ton of ore. We consider this rate to be excessive. The expenses include those which were incurred on prospecting in areas (other than Mochia Mogra central zone) which have not yet reached the stage of commercial exploitation. We do not agree that the latter expenditure

should be written off at this stage and have, therefore, excluded it. The balance should in our view, be distributed over the estimated ore reserves in the Mochia Mogra Central Zone which is now being worked less 25 % which should be left inside as support for the stopes. The incidence comes to Re. 0·30 per ton and has been allowed as an item of expense.

10.3.5. The broad elements of cost of ore for the year 1957-58 are given below :—

<i>Production in tons</i>	1957-58
Run-of-mine ore . . . . .	92,606
Half of ore mined but left inside the mines . . . . .	7,070
<b>TOTAL PRODUCTION IN TONS</b> . . . . .	<b>99,676</b>
	<b>Rs. per ton</b>
1. Wages and salaries . . . . .	4·05
2. Power and fuel . . . . .	2·02
3. Repairs and maintenance . . . . .	0·66
4. Consumable stores . . . . .	5·55
5. Overheads . . . . .	5·74
6. Depreciation and Tools written off . . . . .	3·16
7. Depletion allowance . . . . .	0·30
8. Total . . . . .	21·48
9. Less adjustment on account of averaging with the ores mined since 1950-51 and stocked in the dump . . . . .	1·27
10. Average cost . . . . .	20·21
11. Handling charges . . . . .	0·81
12. Cost of ore mined and handled . . . . .	21·0

10.4. *Cost of concentrates.*—The ores mined were mixed sulphide ores of zinc and lead with small quantities of silver and they were treated by the differential flotation process to produce zinc concentrates and lead concentrates separately. Most of the silver present in the ore was associated with the lead concentrates. The costs of chemicals which were added specifically for the separation of lead concentrates, or zinc concentrates were allocated directly to the respective concentrates. The other expenses have been distributed between the lead and zinc concentrates in the ratio of lead content and zinc content in the respective concentrates. The broad elements of cost are as follows:—

	1957—58	
<i>Production in tons</i>	Lead	Zinc
Concentrates . . . . .	4,877	6,790
Percentage of metal content . . . . .	74·9%	55·5%
Metal content in tons . . . . .	3,653	3,768

	Lead		Zinc	
	Cost of concentrates		Cost of concentrates	
	Per ton Avoirdupois	Per metric ton	Per ton Avoirdupois	Per metric ton
	Rs.	Rs.	Rs.	Rs.
1. Raw materials . . . . .	205·04	201·80	151·91	149·51
2. Power & Fuel . . . . .	26·70	26·27	19·79	19·47
3. Wages & Salaries . . . . .	9·82	9·66	7·27	7·16
4. Consumable stores . . . . .	26·58	26·16	31·16	30·67
5. Repairs and maintenance . . . . .	3·49	3·44	2·58	2·54
6. Overheads . . . . .	13·88	13·66	10·29	10·13
7. Depreciation . . . . .	19·72	19·41	14·61	14·38
TOTAL . . . . .	305·23	300·40	237·61	233·86

10.5.1. *Cost of lead and zinc metal.*—We have stated in paragraph 4·9 that lead concentrates were packed in gunny bags and sent to Tundoo by rail for smelting and refining. Zinc concentrates were sent in bulk to Udaipur where they were packed in mild steel drums and despatched to Japan via Bombay. For determining the actual cost of production we have taken into account the amount of concentrates produced in 1956-57 which was shipped and smelted in 1957-58.

10.5.2. *Lead.*—Actual production during 1957-58 was 3,481 tons of lead (including adjustment for metal in process) from 5,097·25 tons of lead concentrates which were produced more or less along with the zinc concentrates shipped during 1957-58. The average assay of the concentrates smelted was lead 73·73% and silver 23·38 ozs. per ton. We have separated the expenses on the recovery of silver from the cost of production of lead. Royalty on lead concentrates was calculated at the rate of Rs. 15 per ton based on the realised sale value of lead in terms of the lease.

10.5.3. *Silver.*—Silver recovered from hard lead was of 99·6% purity and the assayed quantity during 1957-58 was 318,799 tolas. The expenses which were specifically incurred on the recovery and refining of this silver amounted to Rs. 54·27 per 100 tolas during 1957-58. Quantity of silver sold during that year was 305,058 tolas and the average net realisation was Rs. 178·27 per 100 tolas. Thus the excess realisation from silver amounted to Rs. 124·00 per 100 tolas and at this rate the total amount realisable amounts to Rs. 3,95,310 on the production of 318,799 tolas recoverable from the concentrates smelted during 1957-58.

10.5.4. *Zinc.*—As stated in paragraph 5·4 the processing of zinc concentrates on 'toll basis' is regulated by two agreements one between the Corporation and Mitsui Mining and Smelting Co. Ltd., and the other

between the Corporation and Metal Distributors Private Ltd. Actual expenses incurred on transport, packing, railway and shipping freight on the concentrates shipped during 1957-58, port charges, insurance, analysis and processing charges in Japan and on the shipping freight, insurance and port charges on the returned metal have been taken into account. Royalty has been calculated at the rate of 5 per cent. of the sale value at pits mouth of the zinc concentrates.

10.6. *Return*.—We have observed in paragraph 9.4.3. that we do not see any future for this industry unless a Zinc Smelter is established in this country. We have also urged that steps should be taken to ensure that a smelter goes into regular production by 1962. After this development has taken place, the structure of the industry will undergo a material change. Since the current investigation covers so to say period of transition, we have allowed return at 10 per cent. on the capital employed to arrive at the basic selling price of the metal. The manner in which 'capital employed' is calculated by us has been explained in detail in our Report (1958) on the revision of fair prices payable to cement producers. We have assessed the working capital as equivalent to six months' cost of production in the case of lead metal and 8 months' cost of production in the case of zinc concentrates. As regards the working capital required in the processing of concentrates broadly, we have allowed only the actual interest payable on the amount required for this part of the transaction.

10.7. *Credit*.—Credit for the excess realisation of Rs. 3,95,310 from the sale of silver referred to in paragraph 10.5.3 has been apportioned between lead and zinc in the ratio of the content of these metals in the respective concentrates.

10.8. The following statement contains the break-up of the selling price relating to lead produced during 1957-58, calculated in the manner stated above. The price of this lead is relevant for our purpose as it was produced from lead concentrates which were co-products of the zinc concentrates (relating to the same period) with which we are primarily concerned.

	Per ton Avoirdupois	Per metric tons
	Rs.	Rs.
1. Raw materials (including fluxes and consumable stores)	658.45	648.05
2. Power and fuel	20.39	20.06
3. Establishment and Administrative Overheads	146.12	143.81
4. Repairs and maintenance	9.99	9.83
5. Depreciation	29.26	28.80
6. Royalty	21.96	21.61



	Per ton Avoirdupois	Per metric ton
7. Total . . . . .	886·17	872·16
8. <i>Less credit for silver</i> . . . . .	55·90	55·02
9. Total cost . . . . .	830·27	817·14
10. Return . . . . .	170·42	167·73
11. Fair ex-works price . . . . .	1000·69	984·87
12. Freight to Calcutta . . . . .	19·84	19·53
13. Insurance . . . . .	1·95	1·92
14. Total . . . . .	1022·48	1006·32
15. Selling expenses . . . . .	7·41	7·29
16. Selling price ex-Calcutta . . . . .	1029·89	1013·61

10.9. The following statement contains the break-up of the selling price relating to zinc obtained from the concentrates shipped during 1957-58 calculated in the manner stated in paragraph 10.7:—

	Per ton Avoirdupois	Per metric ton
	Rs.	Rs.
1. Raw materials . . . . .	514·02	505·90
2. Packing and transport charges to Bombay . . . . .	203·38	200·17
3. Port and handling charges shipping freight to Japan and insurance . . . . .	230·78	227·13
4. Analysis and treatment charges . . . . .	421·08	414·42
5. Shipping freight and other expenses on returned metal from Japan to Calcutta . . . . .	101·95	100·34
6. Royalty . . . . .	27·42	26·99
7. Total . . . . .	1498·63	1474·95
8. Credit for silver . . . . .	65·76	64·72
9. Total cost . . . . .	1432·87	1410·23
10. Return . . . . .	139·56	137·35

	Per ton Avoirdupois	Per metric tons
11. Interest on expenses of zinc concentrates from mines to Japan and metal from Japan to Calcutta . . . . .	16.46	16.20
12. Total . . . . .	1588.89	1563.78
13. Selling expenses . . . . .	21.71	21.37
14. Selling price ex-Calcutta . . . . .	1610.60	1585.15

10.10. *Fair selling price of zinc.*—In determining the fair selling price of zinc we have taken note of the price realised by the Corporation from sale of lead (over whose price there is no control), and what residue is available to it from the total gross profit realised from the sale of zinc and lead, after meeting its commitments under bonus and gratuity, managing agents' commission, taxes, etc. The price actually realised from the sale of lead smelted during 1957-58 averaged Rs. 1192.97 per ton and was higher than the selling price calculated by us in paragraph 10.8 by Rs. 163.08 per ton. We have decided that out of the gross realisation the Corporation should be allowed to retain a net surplus of Rs. 3.5 lakhs, which, we consider would be adequate to pay the annual instalment to the Industrial Finance Corporation and to meet other essential expenses. The balance of excess realisation has been adjusted against the selling price of zinc. No provision has been made for enabling the Corporation to declare any dividend on preference or equity shares. On this basis the fair selling price of zinc ex-Calcutta comes to Rs. 1527.30 per ton or Rs. 1503.17 per metric ton. We recommend that the fair selling price of 1812.09 tons of zinc referred to in paragraph 9.1 which was allocated by Government to Tata Iron and Steel Co. Ltd., and Indian Iron and Steel Co. Ltd., should be Rs. 1527.30 per ton or Rs. 1503.17 per metric ton. The difference between this price and the provisional price fixed earlier by Government comes to Rs. 257.30 per ton or Rs. 4,66,250.76 for the 1812.09 tons referred to. This amount will now have to be reimbursed to the Corporation.

11. Our estimates of works costs for future *i.e.*, period ending 31st March, 1961 have been made on the following assumption :—

#### 11.1. Cost of run-of-mine ore.

11.1.1. *Production.*—Annual production has been assessed at 150,000 tons on the basis of a daily output of 500 tons of run-of-mine ore.

11.1.2. *Salaries and wages.*—Provision has been made for extra staff required in the mine for the higher output envisaged. Increment at the rate of  $7\frac{1}{2}$  per cent. per annum has also been provided.

11.1.3. *Power and fuel*.—Suitable adjustments have been made for increases in consumption proportionate to the rise in output.

11.1.4. *Depreciation*.—Has been allowed at income-tax rates including second shift allowance where admissible.

11.1.5. *Handling charges*.—They have been included in the cost of raising the ores.

11.1.6. The broad elements of cost are given in the statement below:—

Annual production		15,000 tons	
		Cost per ton	Cost per metric ton
		Rs.	Rs.
1. Salaries and wages . . . . .		4.27	4.20
2. Power and fuel . . . . .		1.96	1.93
3. Repairs and maintenance . . . . .		0.54	0.53
4. Consumable stores . . . . .		5.82	5.73
5. Overheads . . . . .		4.75	4.67
6. Depreciation & Tools written off . . . . .		1.96	1.93
7. Depletion . . . . .		0.30	0.30
8. Cost of ore mined and handled . . . . .		19.60	19.29

## 11.2. *Cost of concentrates.*

11.2.1. The representatives of the Corporation stated that the limiting factor in the ore-dressing mill is the crushing capacity of the Ball Mill, which, though rated at 500 tons a day, has to be shut down for a fortnight or so every year for relining and major repairs. They urged that the annual capacity should in the circumstances be determined on the basis of 290 working days and fixed at 145,000 tons. Considering the nature of the equipment, we have agreed that the optimum output of the Mill should be taken at 145,000 tons a year.

11.2.2. Since 1956-57 the analysis of the combined lead and zinc contents in the run-of-mine ore has been progressively brought down is under :—

	1956—57	1957—58	1958—59 April-August (April 1958)
Lead percentage . . . . .	3.90	4.08	4.20
Zinc percentage . . . . .	5.49	4.55	4.34
Total metal percentage . . . . .	9.39	8.63	8.5

Even then, the total metal content is higher than the average of 7.3 per cent (2.2 per cent. lead and 5.1 per cent zinc) found in the ore deposits with 3 per cent. cut off. The Corporation has been resorting to “selective mining” of pockets richer in lead in order to cut down

its losses. We have carefully considered the question whether in the interests of increasing the effective life of the mine, the Corporation should be asked to give up such selective mining immediately and to undertake mining of ores of not more than 7.3 per cent. total metal content. One effect of this step will be that there will be a reduction in the output of lead concentrates with corresponding rise in the production of zinc concentrates. The current output of lead concentrate is not sufficient for the Corporation's lead smelter at Tundoo and if the production of concentrates is further curtailed in consequence of a change-over to mass mining, a larger portion of the smelting capacity will remain idle. Further, as zinc concentrates will, for some time to come, have to be smelted abroad, their higher output will inflate the losses of the Corporation. After considering all aspects of the case we have assumed that the average metal content of the run-of-mine ores for the short period covered by this investigation should be

Lead. . . . .	3.5%
Zinc . . . . .	4.5%

On this basis the production of concentrates is expected to be as follows :—

	Tons	Lead	Zinc
Lead concentrates . . . . .	6,250	73%	5.5%
Zinc concentrates . . . . .	9,560	1%	56%
Tailings . . . . .	129,190	0.32%	0.64%

We cannot conclude this paragraph without emphasising once again that Zawar mines constitute at present the only workable zinc deposits in the country and that selective mining for a long period would shorten the effective life of the mines and would be highly detrimental to national interests. In the circumstances the establishment of a Zinc Smelter by the earliest possible date is of paramount importance to national economy.

### 11.2.3. Consumable stores.

11.2.3.1. *Grinding media*.—Grinding media so long used were magnesium steel balls and cannon balls (disposed off by the former Rulers in Rajasthan). Consumption was about 2.3 lbs. or 1.8 lbs. per ton according as cannon balls or magnesium steel balls were used. It was represented to us that cannon balls of the types required had become scarce and that the quantities of balls in stock and on order would last up to the end of July 1959. From August, 1959, the grinding media used would be entirely the more expensive magnesium steel balls. The cost of grinding media for the future has been estimated on the following basis :—

- One-half of the ores will be crushed by cannon balls and the other half by magnesium steel balls up to July 1959.
- Only magnesium steel balls will be used from August 1959 to March 1961.

11.2.4. The broad elements of cost of production of concentrates excluding Royalty are given below:—

	Lead		Zinc	
Production in tons . . . . .	6,250		9,560	
Metal content in tons . . . . .	4,563		5,354	
	Lead		Zinc	
	Cost per ton of concent- rates	Cost per metric ton of concent- rates	Cost per ton of concent- rates	Cost per metric ton of concent- rates
	Rs.	Rs.	Rs.	Rs.
1. Value of ore crushed . . . . .	209.23	205.92	160.50	157.96
2. Power and fuel . . . . .	27.97	27.53	21.45	21.11
3. Wages and salaries . . . . .	7.96	7.83	6.10	6.00
4. Consumable stores . . . . .	29.96	29.49	33.41	32.88
5. Repairs and maintenance . . . . .	3.09	3.04	2.37	2.33
6. Overheads . . . . .	9.56	9.41	7.34	7.23
7. Depreciation . . . . .	12.94	12.74	9.93	9.77
TOTAL . . . . .	300.71	295.96	241.10	237.28

### 11.3. Cost of lead and zinc metal.

#### 11.3.1. Lead.

11.3.1. *Production.*—Recovery of refined metal has been assumed at 93% of lead content in the ore as against 92.63% achieved during 1957-58. Production has been assumed at 4,244 tons.

11.3.1.2. *Salaries and wages.*—Provision has been made for two new officers, namely, one Metallurgist and one Plant Engineer in the interest of efficient working.

11.3.1.3. *Consumable stores.*—Consumption of electrolytic zinc used in the de-silverisation of hard lead has been assumed at 24 lbs. per ton as against 24.4 lbs. per ton which was the actual for 1957-58.

11.3.1.4. *Railway freight.*—The latest rates have been taken into account.

11.3.1.5. *Royalty* has been calculated at Rs. 15 per ton of lead concentrates.

#### 11.3.2. Zinc.

11.3.2.1. *Production.*—We have assumed that the quantity of returned metal would be 4589 tons per annum which is equivalent to 48% of the quantity of zinc concentrates shipped.

11.3.2.2. *Processing charges.*—They have been assumed at \$ 41 per metric ton of dry weight of zinc concentrates corresponding to London quotations between £75 and £86 per ton of zinc.

11.3.3. *Margin for contingencies.*—During the discussion which we had with the representatives of the Corporation the latter raised question of an adequate contingency allowance per ton of lead and zinc. They stated that there had been insistent demand for higher emoluments from labour both at the mine and at the Smelter at Tundoo and that the whole question of wages, provident fund, bonus, gratuity etc. has been referred for adjudication to the Industrial Tribunal in Rajasthan and Bihar respectively. They anticipated upward revision in emoluments. In addition, prices of stores and spares have been going up and loss of output due to occasional break down cannot be ignored. We have given careful thought to this question and feel that a sum of Rs. 30 per ton should be added to the works costs of lead and zinc to cover marginal increases in cost arising from the above factors.

11.3.4. *Return.*—Return has been worked out on the same basis as indicated in paragraph 10. 6.

11.3.5. *Credit.*—We have assumed that the assaying of silver content would remain at 23·10 oz. (Troy) per ton of lead concentrates (which was the average for 17 months ending August 1958). Credit for net realisation from silver has been apportioned between lead and zinc.

11.3.6. The following statement gives, under broad headings, a breakdown of our estimates of the selling price of lead at Calcutta.—

	Cost per ton	Cost per metric ton
	Rs.	Rs.
1. Raw materials, fluxes and consumable stores . . . . .	656·95	646·58
2. Power and fuel . . . . .	20·23	19·91
3. Establishment and Administration overheads . . . . .	138·64	136·45
4. Repairs and maintenance . . . . .	9·97	9·81
5. Depreciation . . . . .	20·90	20·57
6. Royalty . . . . .	22·10	21·75
	868·79	855·07
7. Contingencies . . . . .	30·00	29·52
	898·79	884·59
8. <i>Less</i> credit for silver . . . . .	54·46	53·60
9. Total cost . . . . .	844·33	830·99
10. Return . . . . .	127·42	125·41
11. Fair ex-works price . . . . .	971·75	956·40
12. Freight and insurance to Calcutta . . . . .	24·48	24·09
13. Total . . . . .	996·23	980·49
14. Selling expenses . . . . .	22·50	22·15
15. Selling price ex-Calcutta . . . . .	1918·73	1002·64

11.3.7. The statement below gives our estimates of selling price at Calcutta of zinc :

	Cost per ton	Cost per metric ton
	Rs.	Rs.
1. Raw materials . . . . .	502.21	494.27
2. Packing and transport to Kandla . . . . .	173.56	170.82
3. Handling at Port and freight to Japan . . . . .	203.77	200.54
4. Analysis and treatment charges . . . . .	422.08	415.41
5. Freight and other expenses on returned metal . . . . .	96.86	95.34
6. Royalty . . . . .	30.93	30.44
7. Contingencies . . . . .	30.00	29.53
	1459.41	1436.35
8. Less credit for silver . . . . .	59.10	58.17
9. Total cost . . . . .	1400.31	1378.18
10. Return . . . . .	96.63	95.10
11. Interest on expenses on shipment of zinc concentrates and return of metal . . . . .	18.00	17.72
	1514.94	1491.00
12. Selling expenses . . . . .	23.11	22.75
13. Selling price ex-Calcutta . . . . .	1538.05	1513.75

11.4.1. *Fair selling prices.*—We have loaded the basic selling price of lead with an extra element which will leave with the Corporation a sum of Rs. 3,50,000 year after it has met all its commitments under bonus, gratuity, managing agents' commission, etc. This sum is required to pay the annual instalment to the Industrial Finance Corporation and to meet other essential expenses. No provision has been made for payment of dividends on preference or equity shares. After adding these elements, the fair selling price ex-Calcutta of lead and zinc works out as under:—

Lead Rs. 1123.06 or Rs. 1123 per ton (or Rs. 1105.32 or Rs. 1105 per metric ton).  
Zinc Rs. 1538.05 or Rs. 1538 per ton (or Rs. 1513.75 or Rs. 1514 per metric ton).

11.4.2. *Adjustment of prices.*—Prices of lead are not subject to any control, formal or informal, and current prices in the internal market are fairly high. We consider that any excess realisation from the sale of lead at prices higher than that indicated in the foregoing paragraph should be adjusted against the selling price of zinc. The quantum of adjustment will be a reduction in the price of zinc by Re. 0.92 per ton for each rupee realised from the sale of lead in excess of Rs. 1123 per ton. Thus, if the sales realisation from lead averages Rs. 1400 per ton, the selling price of the recovered zinc would be reduced to Rs. 1283 per ton (a reduction of Rs. 255 per ton from the fair selling price of Rs. 1,538 per ton given in paragraph 11.4.1.).

It will not probably be administratively convenient to pair every consignment of zinc with the quantity of lead derived from the lead concentrates that were produced along with the zinc concentrates against which the particular consignment of zinc was received and to adjust its price with reference to the excess realisation from the sale of that lead. It would, in our view, be sufficient if the price of zinc is adjusted once a quarter with reference to the excess realisation from lead in the previous quarter. We suggest that prices of zinc allocated subsequent to 1812·09 tons of zinc referred to in paragraph 10·10 should be adjusted according to the formula given above at the beginning of a quarter with reference to the gross realisations from the sale of lead in the previous quarter and that this price should be applicable to all supplies made during that quarter.

11.5. *Fair selling price ex-Calcutta of zinc.*—We recommend that the fair selling price ex-Calcutta of zinc allocated to the Steel Companies over and above 1812·09 tons referred to in paragraph 10·10 should be Rs. 1538 per ton or Rs. 1514 per metric ton, so long as the gross realisation by the Corporation from the sale of its lead does not exceed Rs. 1123 per ton. But according to present indications, it will be able to sell its lead at a much higher price in the open market. When the realisation from lead during a quarter exceeds this figure (Rs. 1123 per ton), the selling price of zinc in the succeeding quarter should be adjusted in the manner indicated in paragraph 11·4·2.

12. As the financial position of the Corporation is extremely weak, there should not be any avoidable delay in the allocation of its zinc metal to the Steel Companies and in payment. We recommend that the Corporation should give to Government at least a fortnight's notice of the probable date of arrival at Calcutta of its zinc, the quantity thereof, its gross realisation from the sale of lead in the preceding quarter duly certified by its auditor. On receipt of this notice, Government should determine promptly the fair price and issue the necessary memo of allocation to the Steel Companies indicating the price payable. The Steel Companies should make full payment as soon as possible and in any case not later than three weeks from the delivery of the metal.

13. Our conclusions and recommendations are summarised as under :—

**Summary of conclusions and recommendations.**

(1) Urgent steps should be taken to implement Government's decision to instal a Zinc Smelter in the country and also to ensure that it commences regular production from 1962.

[Paragraph 9·4·3]

(2) The fair selling price ex-Calcutta of 1812·09 tons of zinc which was allocated by Government to Tata Iron and Steel Co. Ltd., and Indian Iron and Steel Co. Ltd., should be Rs. 1527·30 per ton or Rs. 1503·17 per metric ton.

[Paragraph 10·10]



(3) The fair selling price ex-Calcutta of zinc allocated to the Steel Companies over and above 1812·09 tons referred to above and to be allocated in future *i.e.*, till 31st March, 1961 should be Rs. 1538 per ton or Rs. 1514 per metric ton, so long as the gross realisation by Metal Corporation of India from the sale of its lead does not exceed Rs. 1123 per ton or Rs. 1105 per metric ton. If, however, realisation from lead during any quarter exceeds this figure, the selling price of zinc in the succeeding quarter should be adjusted in the manner indicated in paragraph 11·4·2.

[Paragraph 11·5]

(4) Metal Corporation of India should give to Government at least a fortnight's notice of the probable date of arrival at Calcutta of its zinc, the quantity thereof, its gross realisation from the sale of lead in the preceding quarter duly certified by its auditor. On receipt of this notice Government should determine promptly the fair selling price and issue the necessary memo of allocation to the Steel Companies indicating the price payable. The Steel Companies should make full payment as soon as possible and in any case not later than three weeks from the delivery of the metal.

[Paragraph 12]

14. Our thanks are due to the representatives of Metal Corporation of India Ltd., who furnished us with information and gave evidence before us.

**Acknowledgements**

C. R. RAMASUBBAN,

*Chairman.*

S. K. MURANJAN,

*Member.*

J. N. DUTTA,

*Member.*

R. S. BHATT,

*Member.*

**RAMA VARMA**

*Secretary*

**BOMBAY;**

*Dated 6th February, 1959.*

## APPENDIX I

(Vide paragraph 1)

No. 2 (7) Met/57.

### GOVERNMENT OF INDIA MINISTRY OF COMMERCE & INDUSTRY

*the 19th July, 1958,*  
New Delhi, 28 Asadha 1880 Saka.

To

THE SECRETARY,  
TARIFF COMMISSION,  
BOMBAY.

SUB:— Zinc produced by the Metal Corporation of India Fixation of fair price.

SIR,

The Metal Corporation of India have represented to the Government their difficulties in disposing of their production of zinc on account of the present price levels and in view of the national importance of this industry, immediate action is considered necessary. At the same time, Messrs. Tata Iron and Steel Company and Messrs. Indian Iron and Steel Company, who are among the biggest users of zinc in this country, have to be assured of a steady supply of zinc for their use and with due regard to the prevailing foreign exchange position and the importance of the industries mentioned above. Government have decided that the best arrangement is to allocate to these 2 Steel Companies the indigenous zinc, in the proportion indicated in para 2 below, as the price of steel is capable of adjustment on the basis of the Tariff Commission report through the Steel Equalisation Fund.

2. A total quantity of 1440 tons of zinc has so far been allocated to the Steel Companies in the proportion 6 : 4 (1000 tons on the 31st May, 1958 and 440 tons on the 7th July, 1958). Any further allocations made in future to these two companies will be communicated to the Tariff Commission.

3. It is Government's intention that the prices for zinc determined by the Costing Team (appointed by Government earlier in this connection) should be regarded as provisional and that payment of these provisional prices will be made by the two steel companies to the Metal Corporation of India for the present. It is also Government's intention that the final prices should be determined by the Tariff Commission on the basis of an enquiry undertaken by the Commission in terms of Section 12 (d) of the Tariff Commission Act, 1951. The necessary Adjustments in the provisional prices paid to the Metal Corporation of India will be made in due course on the basis of Government's decisions on the Tariff Commission's Report. I am accordingly to request that the matter may be placed before the Tariff Commission with the request that its Report may be made available to Government as early as possible.

4. I am to add that as this price inquiry concerns only the Metal Corporation of India and the two steel Companies, Government do not consider it necessary to refer this case to the Tariff Commission through a resolution.

Yours faithfully,

N. SUBRAMANYHAM,  
*Joint Secretary to the Government of India*

## APPENDIX II

(Vide Paragraph 3.3.)

*List of persons who attended the Commission's Discussions on 23rd Dec., 1958*

### *I. Producer :*

- |                          |              |  |
|--------------------------|--------------|--|
| 1. Shri A.C. Dutta .     |              |  |
| 2. Shri B.C. Chakravarti |              |  |
| 3. Shri S.V. Ayyar .     | Representing | The Metal Corpora-<br>tion of India Ltd.,<br>135 Canning Street<br>Calcutta—1. |
| 4. Shri S.N. Mukherji .  |              |  |

### *II. Government Department :*

- |  |     |  |
|--|-----|--|
| 5. Shri C. J. Shah, Development Officer (Metals) } |     |  |
| 6. Dr. P. Dayal, Development Officer (Metals) }    | Do. | Development Wing,<br>Ministry of Com-<br>merce and Indus-<br>try, Udyog Bhavan,<br>King Edward Road,<br>New Delhi. |
| 7. Dr. M.R. Subramaniam, Geologist . . . . .       | Do. | Geological Survey of<br>India, 27, Chow-<br>ringhee, Calcutta-<br>13.  |
| 8. Shri K. Nagaswami . . . . .                     |     | Senior Cost Accounts Officer, Office<br>of the Chief Cost Accounts Officer,<br>Ministry of Finance, New Delhi.     |

